## AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

**Listing of Claims:**

1. (Canceled)

2. (Previously presented) The system of claim 27 wherein the processor causes the further execution of the step of associating a cost and a revenue to each valid product configuration.

3. (Previously presented) The system of claim 2 wherein the cost associated with each valid product configuration is comprised of a plurality of per option costs.

4. (Canceled)

5. (Canceled)

6. (Previously presented) The system of claim 27 wherein the desired objective of the company is to maximize the profit from the r number of product configurations offered to the company's customer base.

7. (Previously presented) The system of claim 27 wherein the desired objective is to minimize the costs of manufacturing the r number of product configurations offered to the company's customer base.

8. (Previously presented) The system of claim 27 wherein the desired objective is to identify the r number of product configurations offered to the company's customer base that will increase the company's market share.

9. (Previously presented) The system of claim 27 wherein the r number of product configurations is a fixed value provided to the optimization model.

10. (Previously presented) The system of claim 27 wherein the optimization model determines the optimum value of r for the r number of product configurations

11. (Currently amended) The system of claim 27 wherein each feature of the product is assigned to a respective dimension of the product configuration space and wherein each option of the feature is associated with a specific value on that respective dimension ~~configuration is assigned a specific location and order within the n-dimensional vector array and wherein the value of each feature corresponds to the option associated with the respective feature~~.

12. (Canceled)

13. (Currently amended) The system of claim 27 wherein the step of eliminating invalid product configurations further comprises ~~applying mix-and-match rules to the n-dimensional vector array further comprises~~ the step of conducting fast enumeration on partial product configurations.

14. (Previously presented) The system of claim 27 wherein the processor causes further execution of the step of defining configuration neighborhoods based on a relation structure, wherein the configuration neighborhoods identify at least one valid product configuration captured by another valid product configuration.

15. (Previously presented) The system of claim 14 wherein the relation structure is an upgrade relation that identifies at least one feature having an option that is upgradeable for no additional cost to a customer of the product configuration having the upgrade option.

16. (Previously presented) The system of claim 14 wherein the relation structure is a convert relation that identifies at least one feature having an option that is convertible to another option at a respective conversion cost.

17. (Previously presented) The system of claim 14 wherein the relation structure is an acceptance relation that identifies at least one feature having an option that is acceptable to a consumer desiring a different option at a respective acceptance value.

18. (Previously presented) The system of claim 17 wherein the acceptance value is a probability that the customer will accept the acceptance option instead of the different option.

19. (Previously presented) The system of claim 14 wherein the relation structure is an acceptance relation that identifies a plurality of features, each feature having a respective option that is acceptable to a consumer desiring respective different options at a respective acceptance value, the acceptance value being the product of the probabilities that the customer will accept each respective different option.

20. (Previously presented) The system of claim 14 wherein the relation structure identifies at least one valid product configuration that captures another valid product configuration through an upgrade, conversion, or acceptance of at least one option.

21. (Canceled)

22. (Canceled)

23. (Canceled)

24. (Canceled)

25. (Canceled)

26. (Canceled)

27. (Currently amended) A computerized system for identifying~~, in advance, an~~ a globally optimal ~~optimum~~ subset of product configurations from a plurality of possible product configurations associated with a product, wherein the globally optimal ~~optimum~~ subset of product configurations identifies a ~~identify the~~ limited number (r) of product configurations that should be offered to a company's customer base over a predefined future period of time to satisfy a desired objective of the company, wherein (r) is greater than or equal to 1 and wherein each ~~the~~ product configuration includes a plurality of available features and wherein each feature includes a plurality of available options, comprising:

a processor;

a database for storing product configuration data and historical demand data associated with the plurality of possible product configurations, wherein each product configuration includes a specific combination of choices of options associated with the respective product; and

a computer readable medium that is usable by the processor and is operatively coupled to the database, the medium having stored thereon a sequence of instructions that when executed by the processor causes the execution of the steps of:

receiving product configuration data from the database representative of the plurality of possible product configurations;

based on the received product configuration data, representing every product configuration in the plurality of possible product configurations as a point in a multi-dimensional ~~mathematically as an n-dimensional vector array in a possible~~ product configuration space,

wherein the product configuration space has a dimension for each of the plurality of product features; ~~each n-dimensional vector array identifies a unique combination of options associated with its respective product configuration;~~

eliminating all ~~applying mix and match rules to the n-dimensional vector arrays in the possible product configuration space to identify~~ invalid product configurations ~~and, correspondingly, define a plurality of valid n-dimensional vector arrays in a valid product configuration space representing all~~ in order to identify a plurality of valid product configurations as a smaller subset of the plurality of possible product configurations;

receiving historical demand data from the database for ~~the~~ valid product configurations previously sold; ~~the historical demand data including a demand value for each respective feature and option associated with each valid product configuration;~~

simultaneously optimizing all of the dimensions of the product configuration space using an optimization model, but without performing a complete enumeration of the valid product configurations, in order to identify ~~analyzing the valid product configuration space via an optimization model to generate an~~ a globally optimum ~~but limited~~ subset of (r) valid product configurations from the plurality of valid product configurations based on the desired objective of the company and the received historical demand data; ~~values associated with each of the valid product configurations, wherein every valid n-dimensional vector array in the valid product configuration space is analyzed and evaluated according~~

~~to the desired objective of the company prior to identifying the optimum subset of (r) valid product configurations;~~ and

outputting the globally optimal ~~generated optimum~~ subset of valid product configurations that identifies the limited number (r) of product configurations that should be offered to the company's customer base over the ~~a~~ predefined future period of time to satisfy the desired objective of the company.

28. (Canceled)

29. (Canceled)

30. (Previously presented) The system of claim 27 wherein the historical demand data comprises data based on previous sales of the product.

31. (Previously presented) The system of claim 27 further comprising including forecasted future sales of the product as part of the historical demand data.

32. (Canceled)

33. (Previously presented) The system of claim 2 wherein the cost associated with a respective valid product configuration is comprised of costs associated with a combination of options included in the respective valid product configuration.

34. (Currently amended) The system of claim 27 wherein the desired objective of the company is a function of: ~~the step of analyzing the valid product configuration space via an optimization model to generate an optimum but limited~~ subset of r valid product configurations

~~from the plurality of valid product configurations is further based on~~ (i) the cost to manufacture each valid product configuration and (ii) the revenue value of each valid product configuration.

35. (Previously presented) The system of claim 27 wherein the optimization model uses branch-and-bound algorithms to solve linear programs to compute bounds.

36. (Previously presented) The system of claim 35 wherein the linear programs are then solved by using Lagrangian relaxation algorithms.

37. (Previously presented) The system of claim 36 wherein the Lagrangian relaxation algorithms involve maximizing a Lagrangian dual function using a subgradient optimization model.

38. (Previously presented) The system of claim 27 wherein the optimization model further comprises a pattern generation algorithm.